ICS 411: SENIOR PROJECT
Second Semester 992

By

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AIS Academic Information System
Final Report
(Version 1.0)

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Introduction

Colleges and departments, in general, face difficulties in keeping track of all the activities that has to do with faculty and students independently from the registrar office and the personnel. Our project is to design and implement a ***web-based Academic Information System*** for our Information and Computer Science Department.

The system objective is to keep track of all the department faculty and students in database located on the college server and to be viewed through the web on the Intranet, or even through the Internet for authorized users as the system could evolved.

The aim of the *Academic Information System (AIS)* besides keeping track of the faculty and students activities is to generate statistical reports (the faculty annual report could also be generated by the system).

This project is sponsored by the Information and Computer Science Department and Supervised by The Senior Projects Advisor Dr. A. Al-Sukairi and the Automation committee (Dr. J. Al-Ghamdi, Dr. M. Shafique, & Dr. S. Ghanta)

The database should be web enabled. To satisfy this requirement, the web pages should be interactive dynamical html pages. Scripts like *Java*, *ASP, or VB* could be used; tools like *Visual Interdev* and other tools to design the required web pages will be used as well.

Authorized access to the system should be maintained. Therefore, login ids and passwords should be given to users to access the system. DBA for the system should be assigned to maintain the system. Finally, backup technique should be assigned to the system.

Requirements:

Software Environment:

The system will be developed under MS Windows 2000 operating system using Client/Server web-enabled database architecture. The server side will be implemented using MS SQL Server 7.0. The client side will be developed using MS Visual InterDev 6.0 (part of MS Visual Studio 6.0), MS IIS 5 could be used as index server. The MSDN Library will be used as a reference and as on-line help.

Hardware Environment:

The system will be developed on a PC assigned by the department in one of the labs. The user input devices needed are mouse and keyboard. When the project is finished it will be copied to the Department's servers Database Server (MS SQL Server) and Web Server to be available for users. Expected memory needed is less than 50MB with stored data.

User Interface:

The user will access the system via a web-browser through the university's Intranet; the system will be located on the University Intranet with a specific http address provided by the department.

End Users:

This application should provide a secure access to the database, such that, only the authorized people can have an access to the database who are:
1- Dean of CCSE (if needed).
2- Chairman of ICS.
3- Instructors (Professors, Teachers, Lecturers, etc.).
4- Secretary of ICS.
5- Others (e.g. Lab Engineers, Administrators).

Data Analysis:

Each person has different types of data that corresponds to a certain activity he did in the past or he is doing it. These data can be categorized as follows:
1- Personal Data
The faculty has the following personal information
1. ID.
2. Name.

3. Nationality.
4. Date of birth.
5. E-mail.
6. Phone No   (In Kingdom & Out Kingdom).
7. Address   (In Kingdom & Out Kingdom).
8. Fax   (In Kingdom & Out Kingdom).
9. Title (Professors, Teachers, Lecturers, etc.).
10. Status: Which defines the faculty status according to the university policy. Such as:
    a. Sabbatical Leave.
    b. On Loan To.
    c. Leave of Absence.
    d. Admin Duty.
       Each of the above statuses we need to keep track of all the related information to his status situation, such as:
       i. Leaving Date.
       ii. Arrival Date.
       iii. Contact Phone Number.
       iv. Contact Address.
       v. Reported To (Agency, Department, Organization, etc.).

The system will be able to keep track of the following for each faculty:
1. Teaching Preference: by keeping track of the course number and the weight of interest according to predefined scale.
2. Research Interest: by keeping track of the area of interest and the weight of interest according to predefined scale.

The students have the following personal information
1- ID.
2- Name.
3- Nationality.
4- Date of birth.
5- E-mail.
6- Phone No.
7- Address
8- Class (Fr, So, Jar, etc.)
9- Major (CS, COE, etc.)

2- Teaching

The faculty has the following teaching attributes:
1- Semester Number.
2- Courses Names.
3- Sections Numbers.
4- Number of student Enrolled.
5- Evaluation.

3- Student Advising

The faculty will advise number of students each semester, each student could be identified by the following attributes:
1. ID.
2. Name.
3. Level.
4. If the student is Master Student (Graduate), we need the Thesis Topic. Number of advisees can be saved as driven attribute.

4- Administrating work

The faculty could join one or more of administrating works by joining committees
   a. Committee Work
      i. University Committee.
      ii. College Committee.
      iii. Department committee.
   b. Committee Status (Each Committee has its own status)
      a. Standing   (for assigned charges).
      b. Ad-hoc   (for a specific task & time)

5- Committee Services

The faculty could have some community activities such as:
1. Consulting services
2. Other services

6- Research

The faculty ahs the following types of research:
1- Researches Projects:
      i-   Independent (not funded) Project.
      ii-   Sponsored Projects
         a- Not Funded (Assigned by)
         b- Funded
            Each funded type of these researches is either:
               1- Funded by the university.

2- Funded by other organizations.

2- <u>Conferences:</u>
      i-   Supported by the university
      ii-   Not supported by the university

3- <u>Seminars:</u>
      i-   On campus
      ii-   Off campus

4- <u>Thesis:</u>
The faculty could join one or more thesis committees as:
i. Advisor/Supervisor.   (In only one committee) OR
ii. Committee Member.   (In 3 committees)

7- Student Assignments

By keeping track of the student assignment and by whom (Faculty) they are advised. The assignments can be categorized as:
1. Coop & Summer Reports
2. Student Projects

Functional Requirements:

1. The user should have the authorization to logon into the system such that he should have ID# and password.
2. Users could access either his account or other authorized account to access by the department (Secretary).
3. The user would be able to generate (or run) different queries and receives the results in a report format.
4. The system should be able to produce a list of advisors and their advisees.
5. The system should provide the faculty self-evaluation form.
6. The system should be able to produce a list of faculty with their research interests.
7. The system should show student's current or permanent contact information.
8. The system should be able to show committee assignments in a time period.

Non-Functional Requirements:

1. The system should provide various types of searching using index servers, such as the user can provide a date or time interval, and he can view his activities accordingly.
2. The user can add new record, and modify a previous record through the web.
3. The system should have easy (horizontal) web links not hierarchical, using dynamic pages.
4. The system should keep track of data to be used by the department in statistical reports.
5. Easy, simple, and attractive user interface the system should provide.

Prioritization:

The system's most important functional requirements are as follows:
1. Producing the annual form.
2. Implementing some queries.
3. Other Faculty Information services.
4. Then if time allows some Students Information services might be added.
5. The system could be generalized for other departments to use.

Risk Analysis

The system development cycle could face some problems. The identified risks that we could face are as follows listed with the high priority first:

1. Installing & Learning Oracle 8i database development tool could take longer than expected. Which can be resolved by switching to MS SQL Server 7.0.
2. Conflicts between the lab times and the students' times can cause delays in development. Also, having non-exclusive access to a PC machine can also cause delays. Which can be resolved by having exclusive 24-hours (or from 7:00am-9:00pm) access to machine in one of the labs.
3. Designing the appropriate user-interface.
4. If more requirements are added later on, it could cause problems and delay the system completion.
5. To achieve full functionality of the system and getting rid of all the bugs in the system we need to have at least four weeks for testing and redevelopment (modification). Which cannot be achieved because of time constraints.

System Use Cases

The following diagram presents pre-defined (Sample) use cases for the AIS that can be followed to design our system.
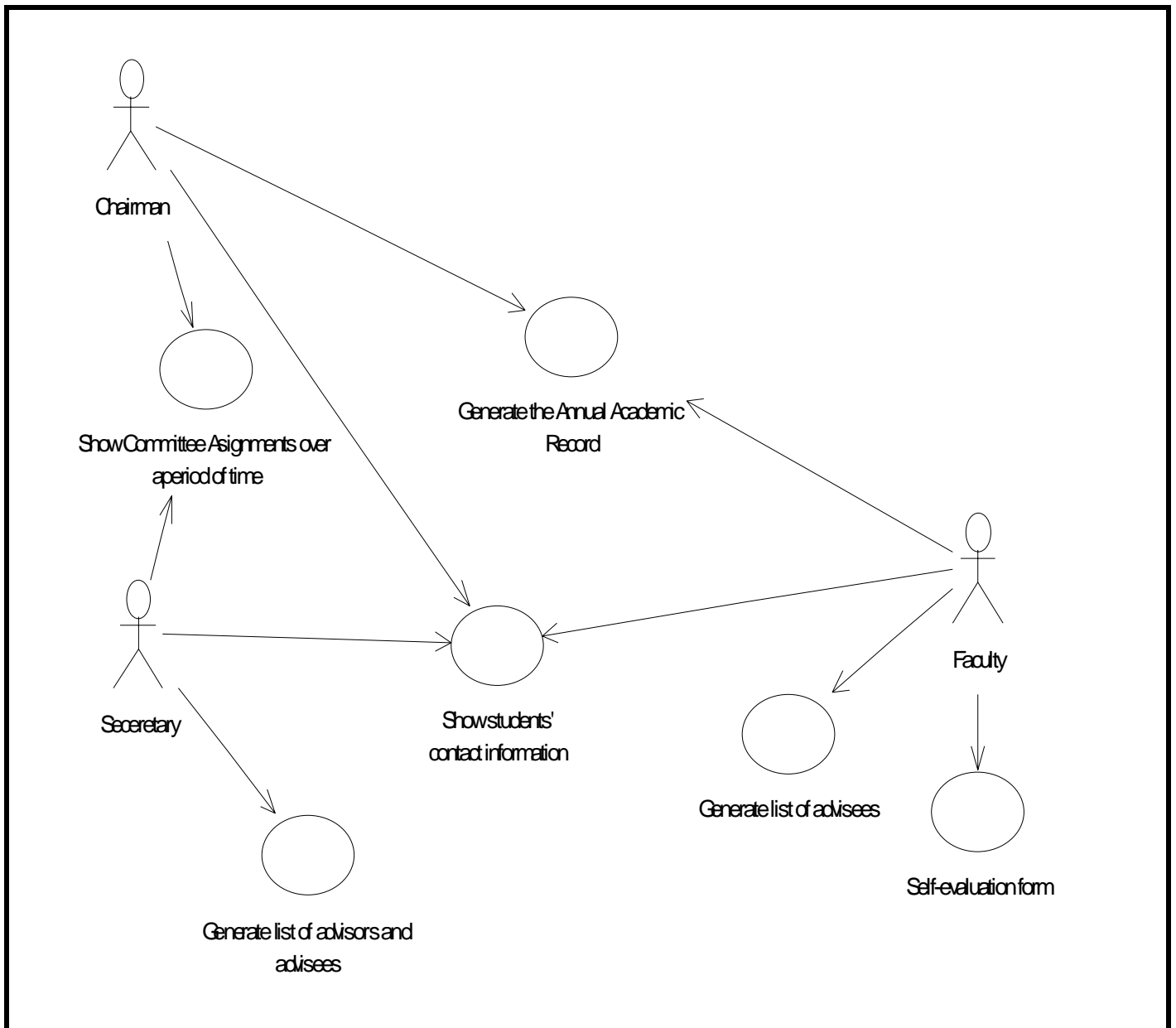

Figure 1 [Sample of the AIS Use Cases]

System Design

Data Model (EER Diagram):

Using Enhanced Entity Relational Diagram, the above data is designed to achieve the predicted requirements of the system. Shown on the next page.

The Model Rules (Constraints):

1. As required to keep track of the historical data, therefore, semester should be available in most of the tables as a key (or as secondary key).
2. The Faculty can join 3 Thesis Committees as member.
3. The Faculty can join only one committee as committee chairman.
4. The attribute (number of advises) is to be generated automatically from the number of students participates as advises for such faculty.
5. All the Domain, Key, and Relationship constraints have to be followed as mentioned above in the EER and the logical schema.
6. Faculty can join in thesis Committee as Chairman in only one committee, and as Member for other only three Thesis Committees.
7. Referential integrity has to be followed in all tables.
8. Number of Advises (attribute from the relation Advises) to show number of students that the faculty is advising, has to be generated by the system.
9. Faculty can teach more than one Offered Course work.
10. Faculty can participate in more than one Teaching Activity.
11. Faculty can participate in more than one Research Project.
12. Faculty can participate in more than one Committee Service.
13. All the attributes with option (Null Ok) are listed above, others have to be specified.
14. Student Assignment can be achieved by more than on Student.
15. All Students (Undergraduate, and Graduate Students) can participate in projects.

AIS EER-Diagram:

The following two pages present the implemented AIS EER diagram, the first page is a complete picture of the AIS EER diagram showing all the attributes, and the other diagram presents the same EER but with a simple presentation showing only the AIS entities.
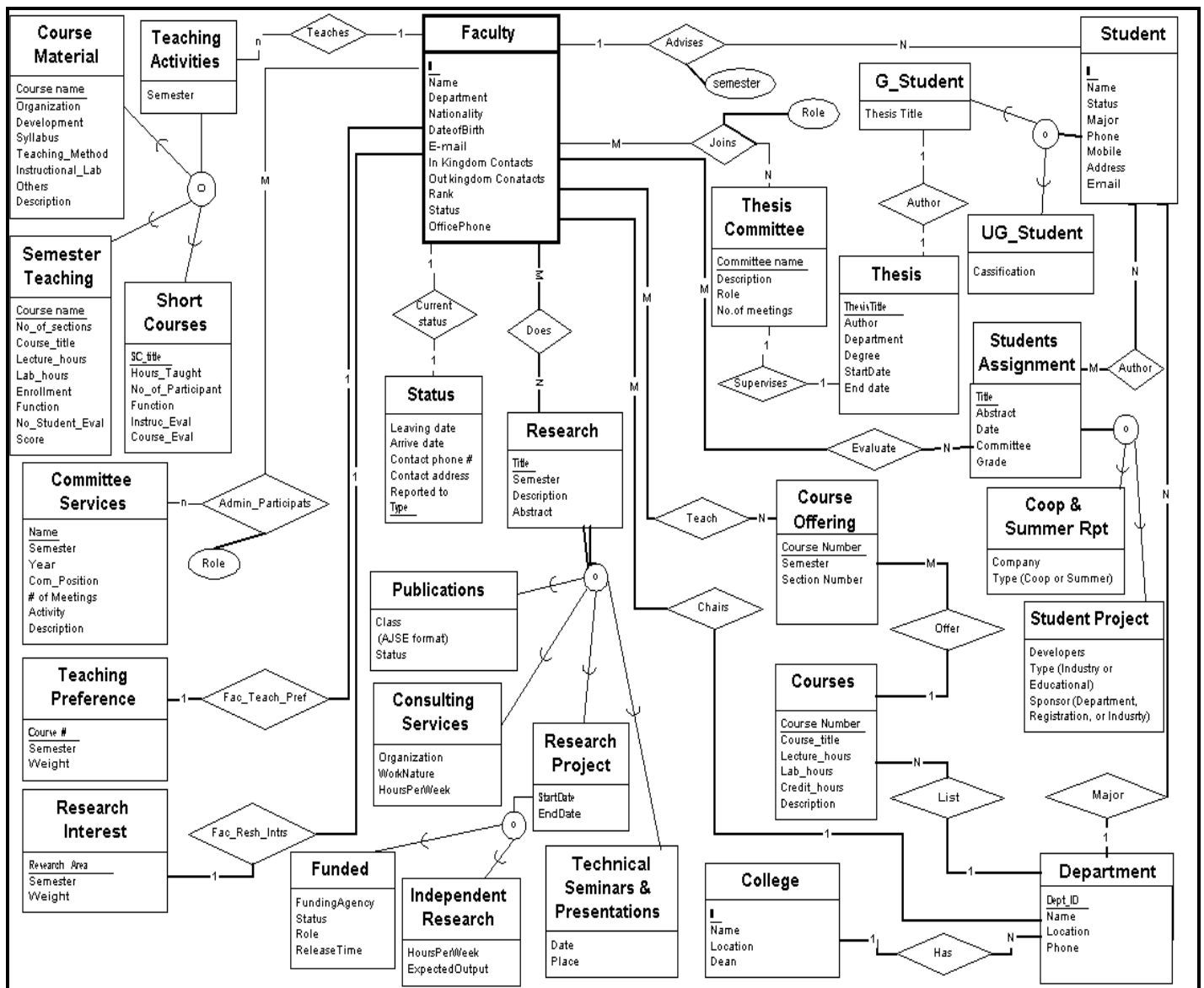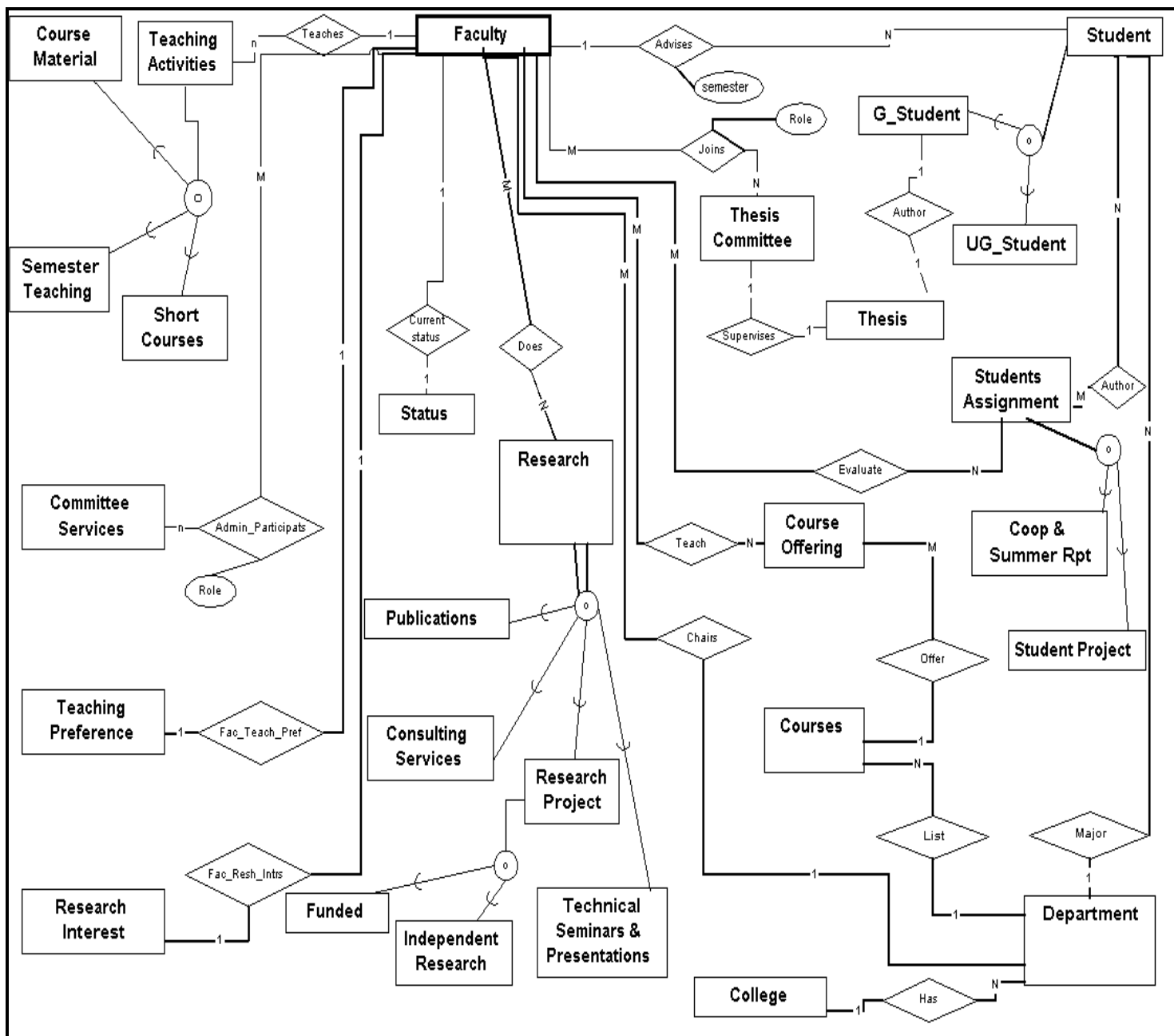
Figure 2 [AIS EER]

Figure 3 [AIS Simple EER]

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AIS Logical Design & Data Dictionary:

Faculty

ENTITY ___Faculity_____

ATTRIBUTE	DESCRIPTION	PRIMARY KEY	FOREIGN KEY	NULL OK	TYPE	WIDTH
ID	**the faculty unique ID**	**X**			**integer**	
Name	the name of the faculity				string	30
Department	the dept in which the faculity work				string	20
Nationality	the faculty nationality			X	string	10
Data_of_birth	birth date of the faculty			X	date	
E-mail	E-mail address of the faculty			X	string	20
Rank	e.g. lecturer, associate proffessor				string	15
In Kingdom Contacts	Phone, Fax, Address, & email In Kingdom					
Out Kingdom Contacts	Phone, Fax, Address, & email Out of Kingdom					
Status	Faculty current location and situation		X		string	15
Phone	list of phone numbers				string	50

FacStatus

ENTITY ___FacStatus_____

ATTRIBUTE	DESCRIPTION	PRIMARY KEY	FOREIGN KEY	NULL OK	TYPE	WIDTH
Leaving_date					integer	
Arrival_date					string	30
Status_Semster	**Status per semester**	**X**			**Integer**	**3 dig.**
Contact_Phone					string	20
Conact_address					string	10
Type	**The Fac. Status Type (e.g. Sabatical Leave)**	**X**			**String**	**30**
FacID	**Faculty ID**	**X**	**X**		**integer**	**8**
Reported_to	Showing the faculty is eported to whom.				string	10

Teaching Activities Entities:

SemesterTeaching

ENTITY   SemesterTeaching

ATTRIBUTE	DESCRIPTION	PRIMARY KEY	FOREIGN KEY	NULL OK	TYPE	WIDTH
CourseID	**unique identifier for each course e.g. ICS434**	**X**			**string**	**8**
Semester		**X**			**integer**	**3 dig**
Fac_ID			X		integer	8
No_of_sections	number of sections given by the course				integer	2 dig.
Course_title	the course name e.g. Advanced Database				string	30
Lecture_hour	the number of lecture hourss assigned to the course				integer	2 dig.
Lab_hours	the number of lab hours assigned to the course				integer	2 dig.
Enrollment	the number of students who takes the course				integer	3 dig.
Function	T:teaching, C:cordinating				string	20
No_student_eval	the number of student who evaluate the course and the instructer				integer	3 dig.
Score	the score of evaluation (out of 10)				integer	0 to 10

ShortCourses

ENTITY   ShortCources

ATTRIBUTE	DESCRIPTION	PRIMARY KEY	FOREIGN KEY	NULL OK	TYPE	WIDTH
SC_title	**Short course title**	**X**			**string**	**30**
Semester	**semester code**	**X**			**integer**	**3 digits**
Fac_ID			**X**		**integer**	
Hurs_tought	number of hours tought				integer	
No_of_participant	number of partiipant				integer	
Function	Faculty function as T:Teaching or C:Cordinating				string	20
Instru_Eval	Instructor Evaluation				integer	0-5
Course_Eval	Course Evaluation				Float	0.0 to 5.0

CourseMaterial

ENTITY   CourseMaterial

ATTRIBUTE	DESCRIPTION	PRIMARY KEY	FOREIGN KEY	NULL OK	TYPE	WIDTH
Course_name	**Course title**	**X**			**string**	**8**
Fac_ID	**Faculty ID**		**X**		**integer**	**8**
Semester	**Semester code**	**X**			**integer**	**3 digits**
Organization	Organization of the course			X	Text	
Development	Development of course material new cousre			X	Text	
Syllabus	Adhrence to course			X	Text	
Teaching Method	Development & use of innovation methods in teaching			X	Text	
Instructional_Lab	Instructional Latratories			X	Text	
Others	Other activiteis related to course material development			X	Text	

Advises

ENTITY   Advises

ATTRIBUTE	DESCRIPTION	PRIMARY KEY	FOREIGN KEY	NULL OK	TYPE	WIDTH
Fac_ID	**Fac. ID**	**X**	**X**		**integer**	**8**
Stud_ID	**Student ID**	**X**	**X**		**integer**	**8**
Semester	**Semester code**	**X**			**integer**	**3 dig.**
No_of_Advises	To be generated				integer	max 40

FacJoinsCommittee

ENTITY   FacJoinsCommittee

ATTRIBUTE	DESCRIPTION	PRIMARY KEY	FOREIGN KEY	NULL OK	TYPE	WIDTH
Fac_ID	**Faculty joins the committee**	**X**	**X**		**integer**	**8**
Committee_name	**Committee Name (Thesis Title)**	**X**	**X**		**string**	**30**
Semester	**Faculty joins committee in semester**	**X**			**integer**	**3 dig.**
Role	aculty role a Member or Chairman				string	10

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Student

ENTITY   Student

ATTRIBUTE	DESCRIPTION	PRIMARY KEY	FOREIGN KEY	NULL OK	TYPE	WIDTH
Student ID	**Student ID number**	**X**			**integer**	**8**
Name	Student name				string	30
FacID	Faculty ID how supe such Student		X		integer	8
StAcadmStatus	Student acadmic sta (e.g. first Honor				string	20
Major	Department Symbol		X		string	4
Phone	Student Phone				string	14
Mobile	Student Mobile. Num				string	14
Address	StudentAddress				string	30
Email	Student Global Email				string	30
Thesis Title	Graduate Students		X		String	50
Classification	As Junior Freshman				string	10

StudThesis

ENTITY   StudThesis

ATTRIBUTE	DESCRIPTION	PRIMARY KEY	FOREIGN KEY	NULL OK	TYPE	WIDTH
Title	**Thesis Title**	**X**			**string**	**30**
Auther	Thesis Auther (student name & ID)				string	30
Department	For which department				string	5
Degree	MS or PhD thesis				string	10
Start date	Thesis starting date				date	
End date	Thesis ending date				date	

Supervises

ENTITY   Supervises

ATTRIBUTE	DESCRIPTION	PRIMARY KEY	FOREIGN KEY	NULL OK	TYPE	WIDTH
ThesisTitle	**Student Thesis**	**X**			**string**	**40**
ThesisComName	**Thesis Commitee Name Supervises Std. Thesis**	**X**			**string**	**40**

StuThesisCommittee

ENTITY   StuThesisCommittee

ATTRIBUTE	DESCRIPTION	PRIMARY KEY	FOREIGN KEY	NULL OK	TYPE	WIDTH
Committee_name	**Committee name as the Thesis Title**	**X**			**string**	**50**
Semester	**Committee Semester**	**X**			**integer**	**3 dig.**
FacID	Faculty ID joins comm.		X		integer	8 dig.
FacCommRole	Faculty role in comm.				string	12
Description	Genric text to descrie th thesis				Text	
No.of meetings	Approxmate number of meetings				integer	2 dig.

Researches:

Publications

ENTITY   Publications

ATTRIBUTE	DESCRIPTION	PRIMARY KEY	FOREIGN KEY	NULL OK	TYPE	WIDTH
(Auto ID)	**System Generated ID**	**X**			**AtNum**	**8**
Title	Research Title				string	50
Fac_ID	The Author of the Research		X		integer	8
Semester	Semster Code				integer	3 dig.
Description	Description of the Reseach				string	50
Address	AJSE format				String	50
Abstract	Research Abstract				Text	
Class	The publication calass (e.g. Jornal Publicatio, Conference Publication)				string	20
Status	The publication status (e.g. Submitted, Uner Prearation)				string	20

FundedResearch

ENTITY _____FundedResearch_____

ATTRIBUTE	DESCRIPTION	PRIMARY KEY	FOREIGN KEY	NULL OK	TYPE	WIDTH
(Atou Number)	**System Generated ID**	**X**			**AtNum**	**8**
Title	Research Title				string	50
Fac_ID	Fac participate in Resh.		X		integer	8
Semester	Per Semester				integer	3 di.
Description	Research Description				string	50
Abstract	Research Abstract				string	50
Funding Agency	Reearch Funded Agency				string	30
Start date	Research Starting Date				date	
End date	Research Ending Date				date	
Satus	Research Status (Under Publication, Issed, etc.)				string	20
Role	If the Faculty is Prinipal nvestigator o Co-Investigator				string	10
Release Time	Expected Release Date				date	

IndependentResearch

ENTITY _____IndependentResearch_____

ATTRIBUTE	DESCRIPTION	PRIMARY KEY	FOREIGN KEY	NULL OK	TYPE	WIDTH
(Atou Number)	**System Generated ID**	**X**			**AtNum**	**8**
Title	Research Title				string	50
Fac_ID	Fac ID (Author)		X		integer	8
Semester	Research Semester				integer	3 dig.
Description	Research Description				string	50
Abstract	Research Absrtact				string	50
Start date	Research Starting Date				date	
End date	Research Ending Date				date	
Hours per week	Num of Working ours per Week				Time	
Expected output	e.g. Journal, Engineering Design, Software, etc.				string	10

Technical Seminars & Presentations

ENTITY_____Seminars_____

ATTRIBUTE	DESCRIPTION	PRIMARY KEY	FOREIGN KEY	NULL OK	TYPE	WIDTH
(Atou ID)	**System Generated ID**	**X**			**AtNum**	**8**
Title	Semminar Title				string	50
Fac_ID	Fac ID		X		integer	8
Semester	Seminar Semester				integer	3 dig
Description	Seminar Presentation				string	50
Abstract	Seminar Abstract				string	50
Date	Date of Presentation				date	
Locatin	Location of the presentation				string	20

ConsultingServices

ENTITY_____ConsultingServices_____

ATTRIBUTE	DESCRIPTION	PRIMARY KEY	FOREIGN KEY	NULL OK	TYPE	WIDTH
ProjectName	**Project Name to be consulted**	**X**			**String**	**30**
Organization	To be consulted				string	30
Fac_ID	The Fac. ID as consultant		X		integer	8
Semester	semester code				integer	3 dig
Description	Work description				string	50
location	Location of service				string	50
Work nature	Type of service provided				string	50
Hours per week	Working hrs per week				integer	2 dig
Start date	Consulting starting date				date	
Start date	Consulting ending date				date	

CommitteeServices

ENTITY   CommitteeServices

ATTRIBUTE	DESCRIPTION	PRIMARY KEY	FOREIGN KEY	NULL OK	TYPE	WIDTH
Committee_name	**Committee Name**	**X**			**string**	**30**
Fac_ID	Faculty ID that joining the committee		X		integer	8
Semester	**semester code**	**X**			**integer**	**3 dig.**
Year	Committee Working Year				integer	4 dig.
Category	Standing or Ad Hoc				string	10
Description	Describing th work nature				string	30
status	It College, Department, University, or ther type of committee				string	20
FacComPosition	Member or Chairman				string	10
Comments	Geniric Text				Text	
Actiity	Type of service provided by the Committee				string	20
NumMeetings	Approx. No. of attende meetings				integer	2 dig.

TeachingPreference

ENTITY   TeachingPreference

ATTRIBUTE	DESCRIPTION	PRIMARY KEY	FOREIGN KEY	NULL OK	TYPE	WIDTH
CourseName	**unique identifier for each course e.g. ICS434**	**X**			**string**	**8**
FacID	**Faculty ID that wants to teach the course**		**X**		**integer**	**8**
Semester	**Teaching Preference Per Semester**		**X**		**integer**	
Weight	priority of this course to faculty				integer	

ResearchInterest

ENTITY   ReaserchInterest

ATTRIBUTE	DESCRIPTION	PRIMARY KEY	FOREIGN KEY	NULL OK	TYPE	WIDTH
ResearchArea	**e.g. Software Engineering, Dastabases, OOP etc.**	**X**			**string**	**20**
FacID	**Faculty ID that is interested in this area**		**X**		**integer**	**8**
Semester	**Faculty Reaserch Interest per Semester**		**X**		**integer**	**3 dig.**
Weight	priority of interest				integer	2 dig

CourseOffering

ENTITY   CourseOffering

ATTRIBUTE	DESCRIPTION	PRIMARY KEY	FOREIGN KEY	NULL OK	TYPE	WIDTH
CourseName	**From dept. Courses**	**X**			**string**	**8**
Semester	**Offered courses in Sem.**	**X**			**integer**	**3 dig.**
Section number	**Section numbers**	**X**			**integer**	**2 dig.**

Courses

ENTITY   Courses

ATTRIBUTE	DESCRIPTION	PRIMARY KEY	FOREIGN KEY	NULL OK	TYPE	WIDTH
CourseName	**unique identifier for ea course eg. 434**	**X**			**string**	**8**
CourseDept	department offering this course eg. ICS		X		string	5
Course_title	name of the course eg Senior Project				string	30
Lecture_Hours	Course number of lecture hours per week				integer	2 dig.
Lab_Hours	Course number of lab hours per hours				integer	2 dig.
Credit_Hours	Course total number of offered hours				integer	2 dig.
Description	Catalogue dsescription o the course				string	

Colleges

ENTITY   College

ATTRIBUTE	DESCRIPTION	PRIMARY KEY	FOREIGN KEY	NULL OK	TYPE	WIDTH
CollegeID	**unique identifier for ea college eg. CCSE**	**X**			**string**	**6 dig.**
Name	Name of the college				String	30
Location	Building and room (Address)				String	10
DepartmentID	College particepate in Department ID				String	10
Chiarman	Chairman ID				string	20

Department

ENTITY   Department

ATTRIBUTE	DESCRIPTION	PRIMARY KEY	FOREIGN KEY	NULL OK	TYPE	WIDTH
DeptID	**unique identifier for each department eg. ICS**	**X**			**string**	**8**
Name	Name of the department				String	30
Location	Building and room num (Address)				String	10
DeanName	Dean's Name				string	20
DeanID	Dean's ID (Faculty)		X			8
PhoneNum	Telephone Number				String	20

Coop & Summer Training Report

ENTITY   CoopSummerReport

ATTRIBUTE	DESCRIPTION	PRIMARY KEY	FOREIGN KEY	NULL OK	TYPE	WIDTH
(Auto ID)	**System generated ID**	**X**			**string**	**8**
Title	Report Title				string	30
AuthorID	Thesis Author ID		X		string	8
AuthorName	Report Author Name				string	20
ReportDate	Date of submission				date	
Abstract	Report Abstract				Text	
Committee	Supervision committee of the report				string	30
Grade	The grade given for the Coop or Summer				string	3 dig.
Company	The name of the company that trained the student				string	30
Type	Summer or Coop				string	10

StudentProject

ENTITY   Student Project

ATTRIBUTE	DESCRIPTION	PRIMARY KEY	FOREIGN KEY	NULL OK	TYPE	WIDTH
(Auto ID)	**Assignment Title**	**X**			**string**	**8**
Title	Assignment Title				string	50
DevelopreID	Project Deveoper ID		X		string	8
DeveloperName	Project Deveoper Name				string	20
date	date of submission				date	
Committee	The committee Name (or course) who will assign the grade				string	20
Grade	The grade given for the Coop or Summer				integer	3 dig.
Company	The name of the company that trained the student				string	30
Type	Industry or Educational				string	10
Sponser	Department, Regestration, Educational, or Industrial				string	10

AIS Web Site Structure:

The following diagrams represent the implemented web site structure of the AIS, located at web server, to be used from the user side (User Interface) to view the database, located at the SQL Server. The diagrams are taken as implemented using Visual Interdev.

This diagram presents the basic web site structure without the sub-sites (the plus signs presents the rout for the sub-sites presented on the coming diagrams):
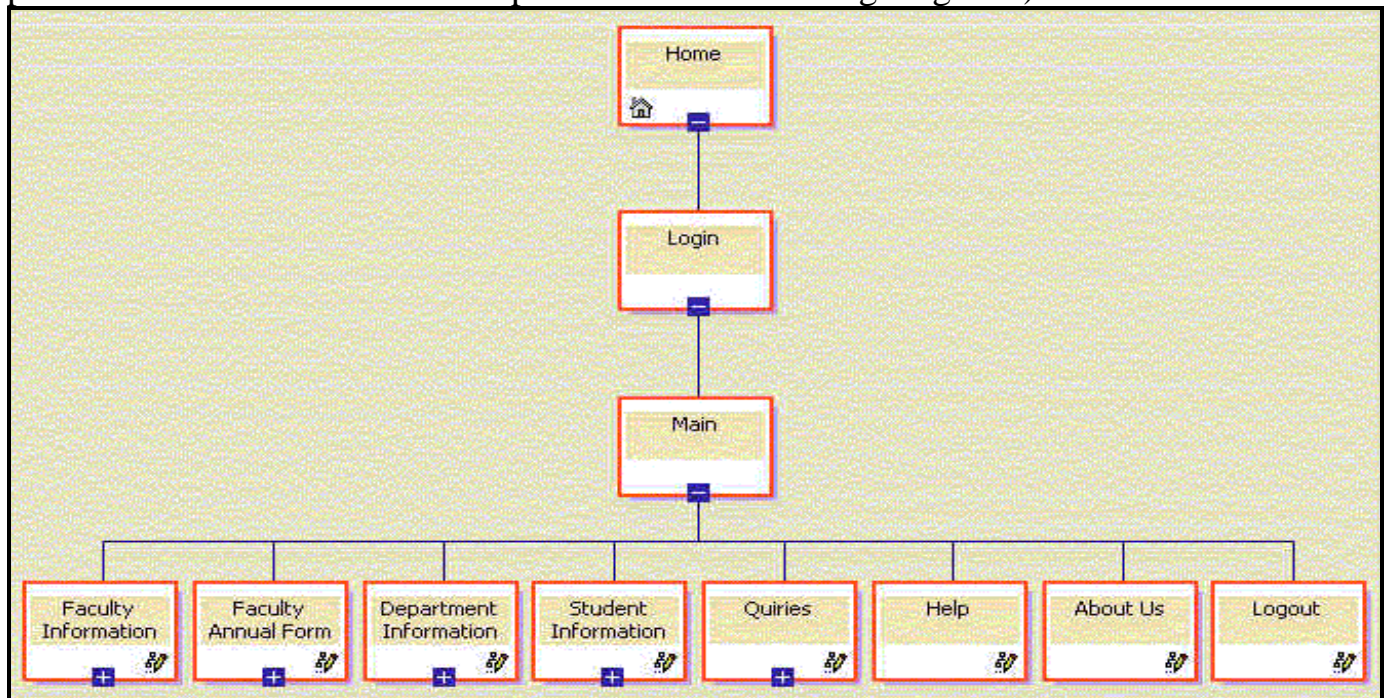
Figure 3 [AIS Basic Web-Site Structure]

The following diagram present the Faculty Information Sub-Activities Structure, which contains all the faculty activities presented as forms & functions:
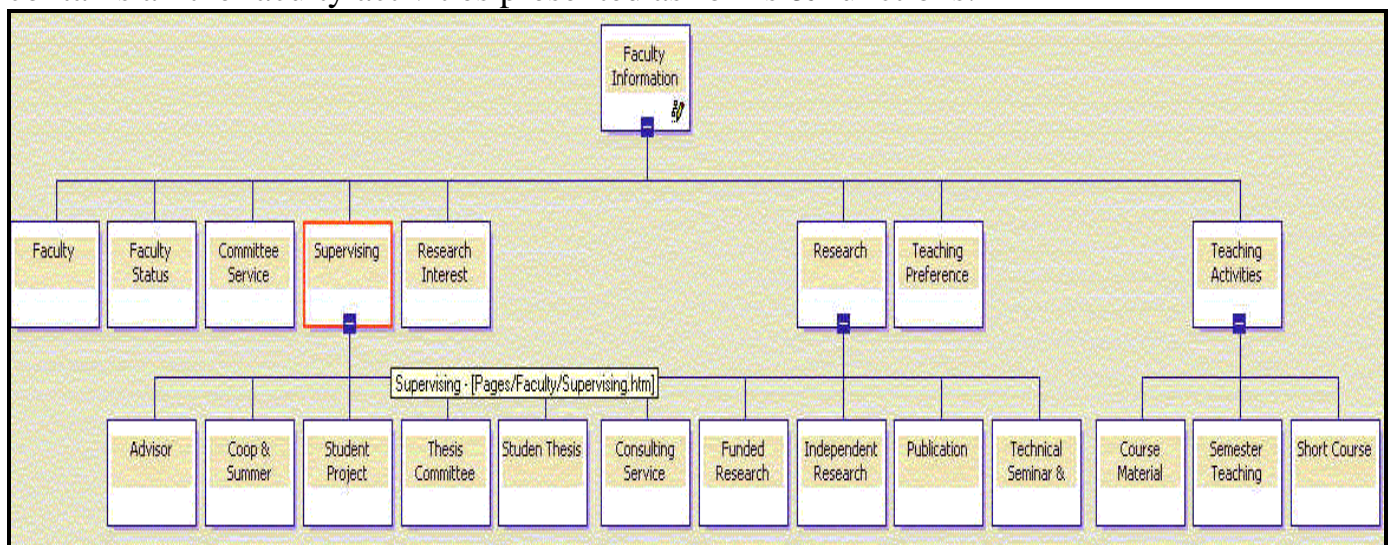
Figure 4 [AIS Faculty-Sub-Web-Site Structure]

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The following diagram presents the remaining four main system functionality, which are the:

- Student Information: Contains student related forms and functions.
- Department Information: Contains College & Department related forms & functions.
- Queries: List of predefined queries that saved and run by the system.
- Faculty Annual Evaluation Report: Contains to options that we can view the report by, either by hyper link of each part of the report independently, or by one-shot tabular report presenting all the parts and their fields of the report.
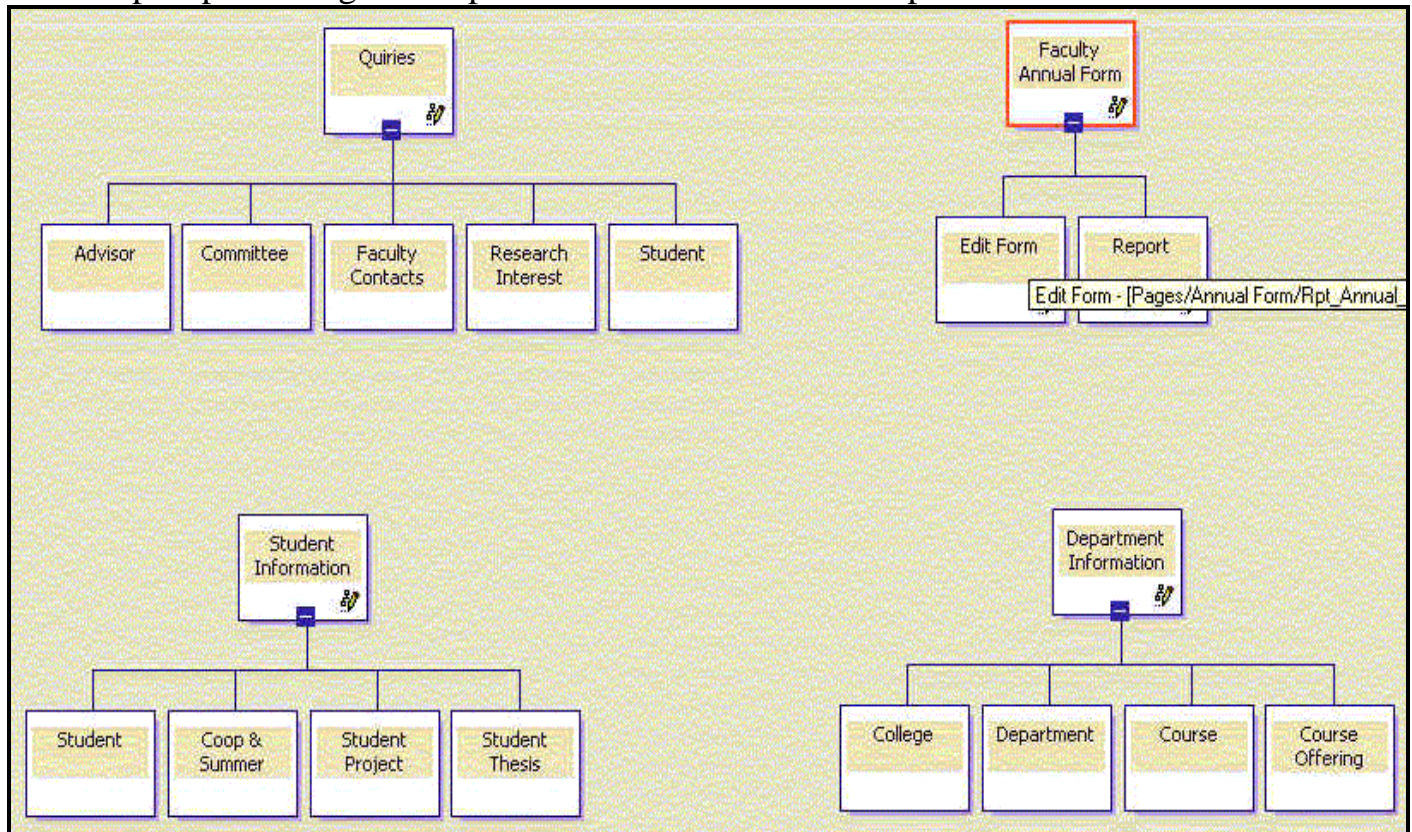
Figure 5 [AIS Web Structure Cont.]

The remain entities, which are:

- Help: will contain tow types of the help options, one as MS HTML Help format, and the other option as rtf file as User Manual hocked to the system, to be printed or viewed.
- About Us: General description about the system, the ICS department and every person helped in developing the Academic Information System.
- Log Out: Is the user log out screen, which will exit the system, and it will end browsing it.

System Implementation:

The above design which map the requirement has been implemented in to sub systems, which are:

Database Subsystem:
Using the MS SQL Server 7.0 to implement the database design (AIS EER) to physical database:
- AIS as MS SQL database, has to extensions AIS.mdf and AIS.ldf.
- To have the AIS database on new server, copy the files under MS SQL Data folder, and use the Attach quiry shown below:
  - Attach Quiery Syntax: *EXEC sp_attach_db 'AIS', 'c:\mssql7\data\AIS.mdf', 'c:\mssql7\data\AIS.ldf'*
- The system will be saved on a server and by connecting the MS SQL Server to AIS web site; the database can be view through the User Interface, described on the next section.
- Quires are predefined, and to be run on the database side.
- Users are to be predefined on this side as the main security level of the database, as well as the System Administrators.
- Special data types that are used by some attributes are defined and used (e.g. FacultyID Type, StudentID Type, and Semester Type).
- Diagram representing the relation between the tables is created on the database side.

User Interface Side:
Using MS Visual Interdev 4.0 to view the database using the Intranet, by following the AIS Web Site Structure:
- To view the system, a web server is required to run the web site of the AIS.
- IP address should be assigned to the web site.
- Each entity from the database has html form to modify or to view its data.
- On each page, Horizontal links for the main system functionality (check Figure 3).
- From the main system functionality, Vertical links for the sub-pages.
- Each form has user interaction as buttons (e.g. Add, Delete, Save, Print, List).
- Number of Queries is listed, and the results to be viewed from the SQL Server as HTML page.
- Additional Security level is to provide authorized user ids and password from the web server, to access the system web site.

Current System Evaluation:
As developer, we evaluated our system independently, using software engineering terms, and by keeping some fields empty null waiting for the system performance during the testing phase:

Category	Percentage	Description
Understandability & Visibility	80%	Easy to understand by other developers
Portability	95%	Due to system files formats, its portable
Supportability	95%	Has great flexibility to be supported in future
Acceptability	75%	Depends on the users, changeable
Reliability	??%	Waiting for the testing phase results
Robustness	50%	Depends on the MS SQL 7.0 Performance
Maintainability	95%	Greatly maintainable
Reuse & Inheritance	95%	Two subsystems, with portable formats
Security	60%	To be changed after security setting on the database side and the web server side, further testing
Testability	95%	Easy to be tested
Adaptability	85%	
Complexity	95%	Has low level of complexity
Usability	85%	Can be reuse in future updates, especially database subsystem
Efficiency	75%	To be changed and improved in further updates and testes
Learnability	95%	Easy to learn by users or by administrators

Table 1 [AIS Version 1.0 Pre-Testing Evaluation]

System Evolution:

The system has a great flexibility to evolve, some of the evolution points are listed below, and these points either are aimed by the developers to be achieved in near future, or by additional requirements and approval by the users. The following can summarize these points:

- Further Student related functionality (entities) could be added to the system design, therefore, the system database and web site.
- Additional queries to be mapped from the database, and viewed by the system web site.
- Other departments or even colleges can use the system.
- The system can accessible via the Internet.
- The system database could be converted to other environments, such as MS SQL Server 2000, or Oracle 8i.
- User can submit his quire to the system via the web site, and receives its result through the web (ad hoc client side query).
- Ad hoc reports can be provided by the system.
- Further Help options can be added to the system (e.g. predefined buttons, help bars, complete MS HTML Help Library, etc.).
- Web (User Interface) cosmetics can be added.
- Some data warehousing techniques, such as data analysis and future expectations, could be added to the system.

Conclusion

As a conclusion, working on such system provided us with new techniques. From each phase from the project there were new techniques, many new stuff to know about, up to date tools, and environments, professional communication skills, which includes business communication skills and technical skills. As first stage of the system, we had to focus more on the system quality on some of its functionality, and to extend its functionality in future. In addition, defining risks, and analyzes them, and prepares pre-solution plans for such problem is very important issue in any project. Finally for better working atmosphere, and for advance results, teamwork is important skill that has to be maintained to achieve the project goals, with professional quality and type of work.

USER MANUAL

King Fahd University of Petroleum and Minerals
Department of Information and Computer Science
College of Computer Science and Engineering

User Guide

Contents:

1. System Requirements

Hardware Requirements:
1. Server (or tow server) connected to the Intranet, with URL & IP Address.
2. Client machines connected to the network (Intranet).

Software Requirements:
1. MS NT, 98, 2000 Operating System.
2. MS SQL Server 7.0 or newer versions on the server side.
3. Web Server to connect AIS web site to the SQL Server.
4. Intranet Browser to view the system web site.

2. System Installation

Database Side:
1. AIS as MS SQL database, and from the AIS CD under the Database folder, AIS has to extensions AIS.mdf and AIS.ldf.
2. To have the AIS database on new server, copy the the above files under MS SQL Data folder (e.g. *'c:\mssql7\data\'*).
3. Use the Attach quiry shown below using the <u>Query Analyzer</u>:
   Attach Quiery Syntax:
   > *EXEC sp_attach_db 'AIS', 'c:\mssql7\data\AIS.mdf', 'c:\mssql7\data\AIS.ldf'*

Web Site (User Interface) Side:
1. On the AIS CD two folders Web_Local (to modify the web site through) & Web_Server (to be accessed by users).
2. Copy the both to the web server directory.
3. From the Web_Local, run the AIS.VIP (AIS Visual Interdev Project File).
4. Connection should be established with the MS SQL Server (as System Adminstrator).
5. Knowing the IP address of the Web Server, the AIS web site will be ready to be viewed.

AIS Address & Locations

AIS SQL Server: _____.

AIS Web-Site IP Address: http://_____.

3. User Setup & Securities

Database Security:

From the MS SQL Server and as System Adminstrator:

Enterprise Maneger → AIS directory (under Database folder) → Users (right click to add new user) → Add/Modify User Information & Permissions.

Web-Site Security:

From the Web Server, Define users (Login Ids, & Passwords) that can access the AIS Web Site, specific permissions on specific web pages and operations can be assigned to the defined users.

4. AIS Start Browsing

From the client machine, lunching the Intranet Browser, type in the address bar the AIS web site address (http://_____).

The start up page, as introductory page will be downloaded to the browser, which is:
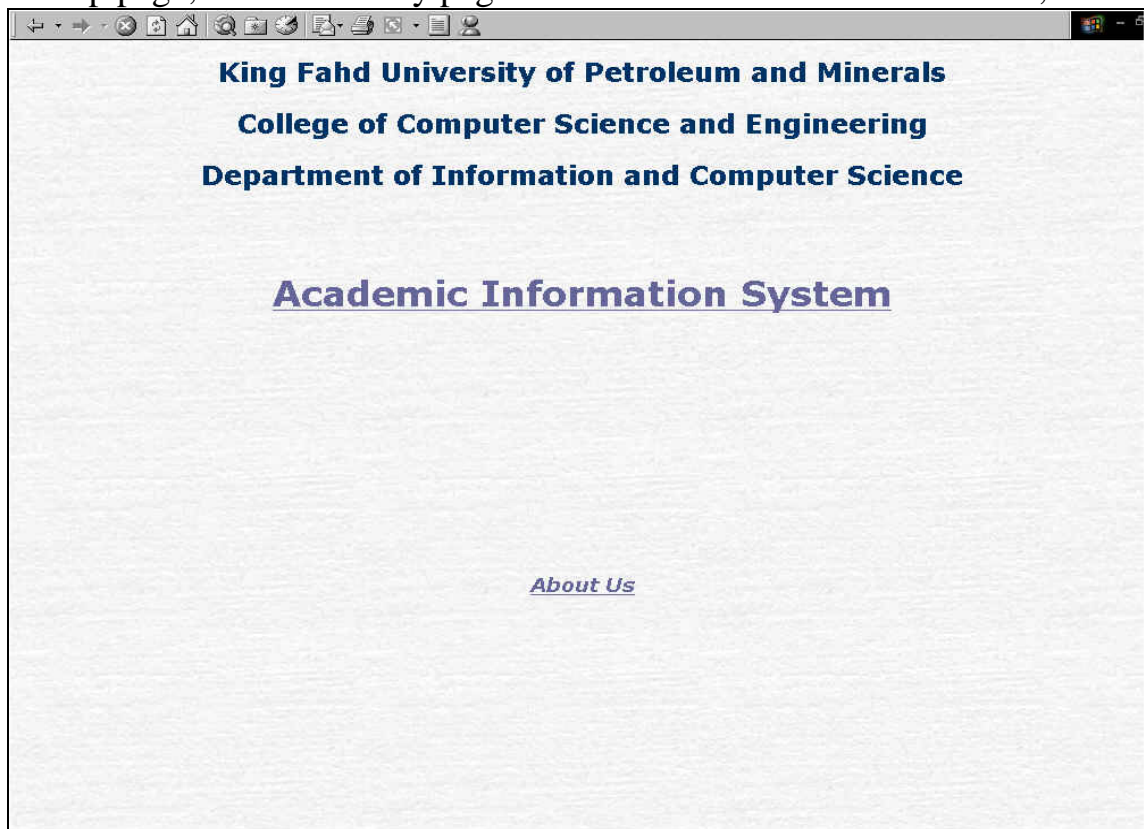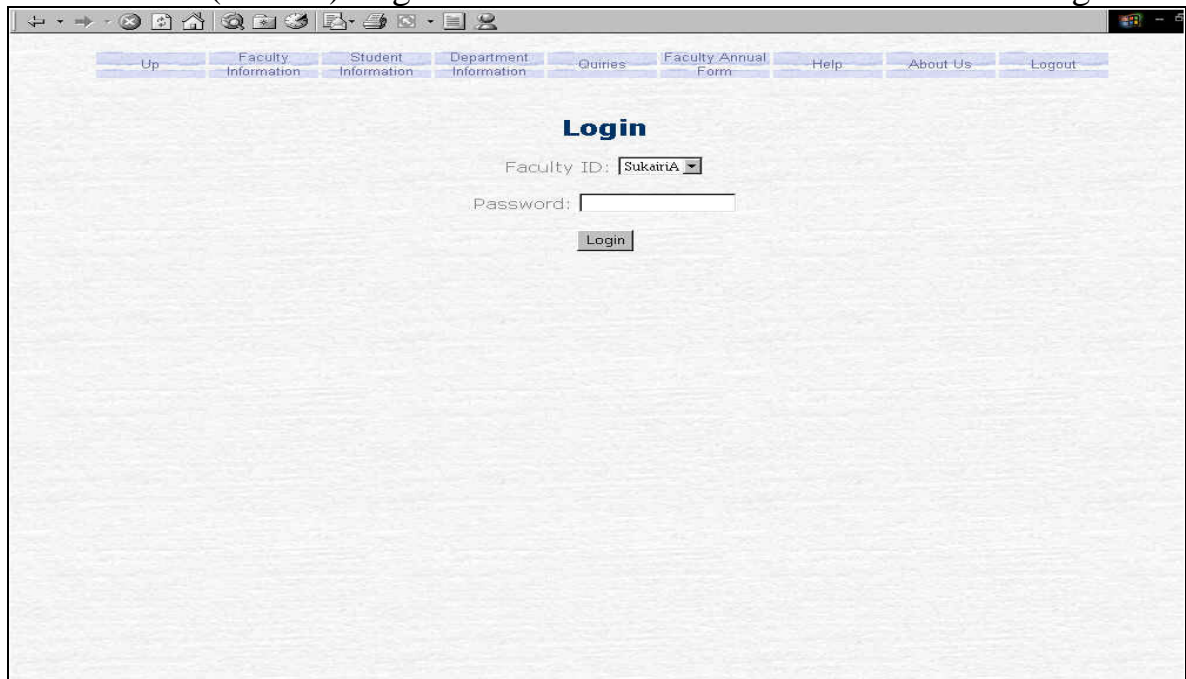
By clicking on the Academic Information System link, the login screen will appear.
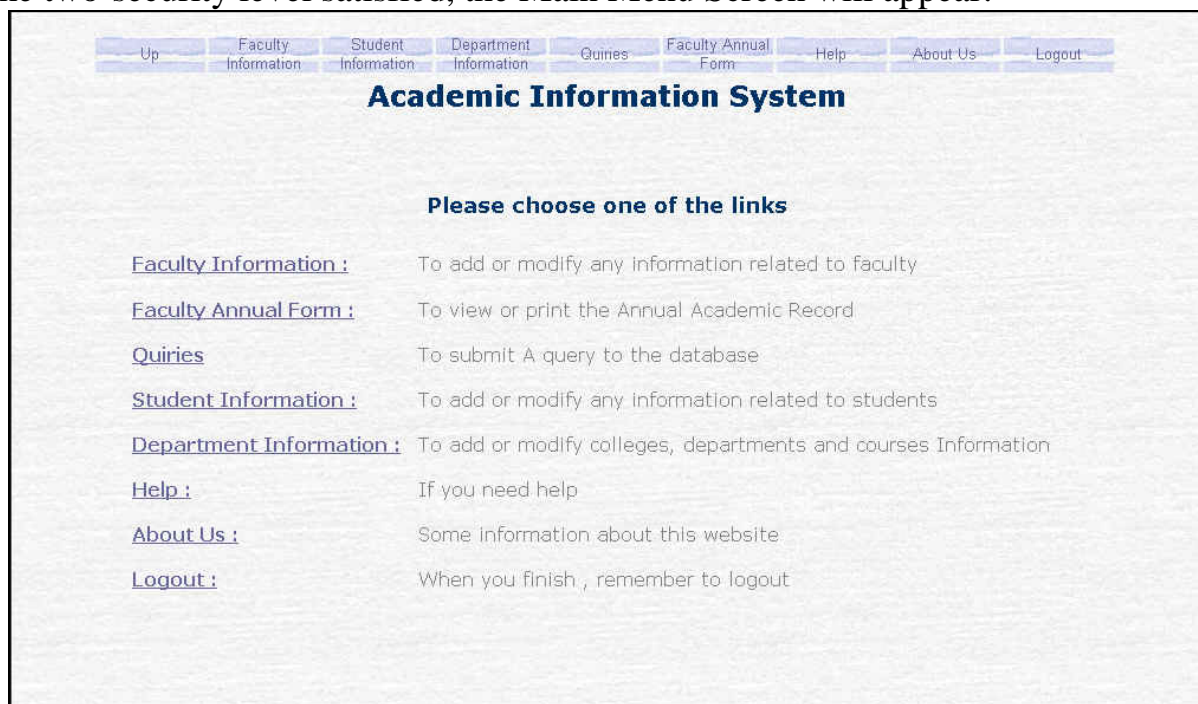
5. AIS Login

Two security levels will be maintained by:
1. User will enter secure connection, which will ask him to enter the AIS Web Server Login ID & Password.
2. The Database (Record) Login ID & Password will be entered via the Login Screen:

If the two-security level satisfied, the Main Menu Screen will appear:

From the above Main Menu Screen, we realize a horizontal links and a vertical links that can be summarized by the following:

- **Student Information:** Contains student related forms and functions.
- **Department Information:** Contains Courses, Colleges & Departments related forms & functions.
- **Queries:** List of predefined queries that saved and run by the system.
- **Faculty Annual Evaluation Report:** Contains to options that we can view the report by, either by hyper link of each part of the report independently, or by one-shot tabular report presenting all the parts and their fields of the report.
- **Help:** will contain tow types of the help options, one as MS HTML Help format, and the other option as rtf file as User Manual hocked to the system, to be printed or viewed.
- **About Us:** General description about the system, the ICS department and every person helped in developing the Academic Information System.
- **Log Out:** Is the user log out screen, which will exit the system, and it will end browsing it.

The first four links contain number of sub-links for each activity covered by that link.

6. Using AIS Sites

- To show how we can use the system sites, it will be sufficient to show how to use one site, since the system screens are coherent.

- First from the Main Menu or from other screen bar, by pressing (clicking) on the name of the entity (Department, Faculty, or Student), then to select what record to work on by pressing on the link within each screen.

- Each screen contains the Main Menu links, as well as record operation (Add, Delete, Save, Clear, Navigation Buttons).

- Each screen that presents a record, the button "List", will present a list of all the records available for such main entity (e.g. Faculty 123).

- The following represents two screens for the same faculty activity (Independent Research), the first screen for entering the data as Record Screen, and the next screen represent Tabular Screen "view" for all the records stored within the same Faculty Activity Field (Independent Research).

To select Independent Research from the Faculty Information Screen after choosing it from the Main Menu:

Faculty Information → Research

Faculty Information → Research →Independent Research

The above screen shows the Main Links Bar at the top of the screen. The Record Operation Buttons are clear. And the Links for other activities under Research are shown as well.

Faculty Information → Research →Independent Research → List (Tabular Format of all Records)

7. Producing The Faculty Annual Evaluation Form

- One of the main features of the Academic Information System is to produce such report on line, from stored data, describes the faculty activities for an academic year.

- By pressing the link of the Faculty Annual Evaluation Report, we will have to options of producing the report, either by producing each part of the report (Research Activity, Teaching Activity, etc.) separately, or one shot report which covers all the report parts.

- Either option, by specifying the Academic Year needed to produce the report and press the submit button, the user will have the repot ready to be produced and viewed.
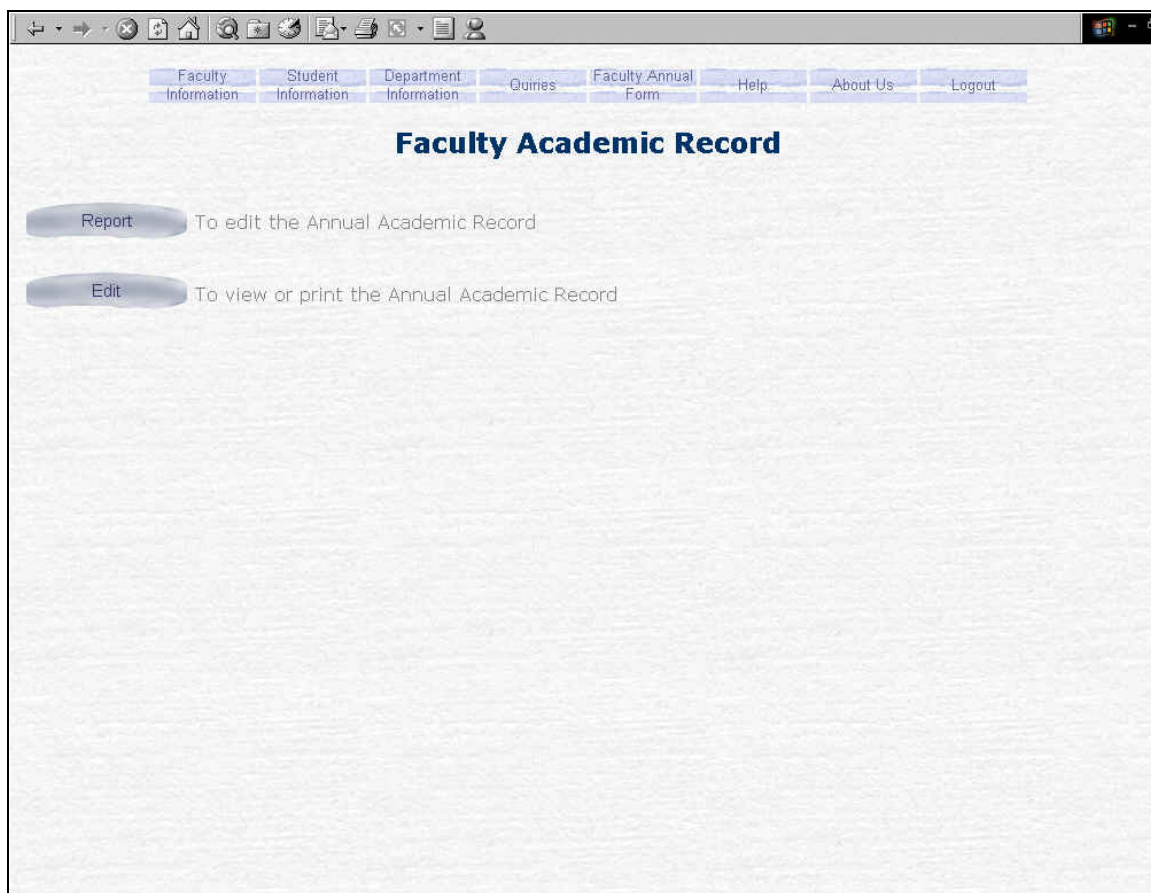

8. Logout

To exit the system, and to leave the AIS secure web site. By pressing on the "Logout" link, the user will be promoted, that he is about to leave the System and the AIS Secure Web Site, if he confirmed, he will exit the system.

9. About Us

The system has a web site presenting:
1. Brief description about the Academic Information System.
2. Names and contacts of every person helped to develop the system.
3. Hyper link to send any feedback to the system developers through the email.
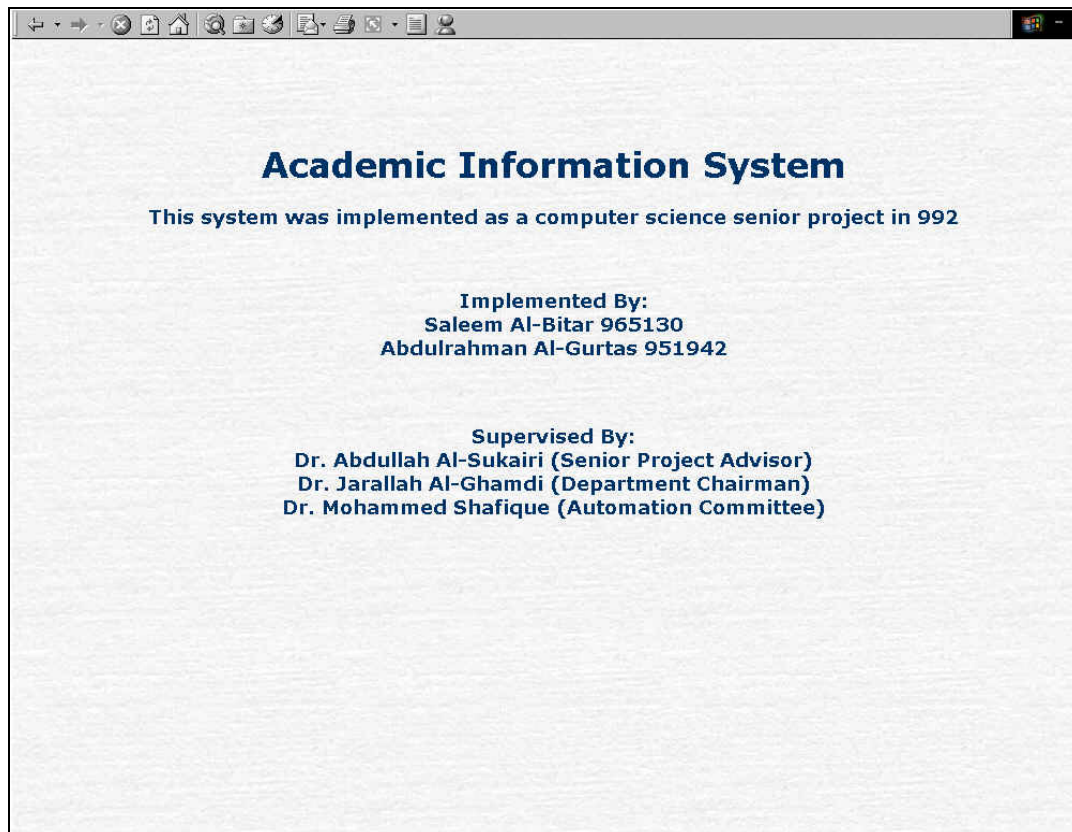
Developers:

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APPENDIX